Ibuprofen may block damage from fetal-alcohol exposure

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An anti-inflammatory drug may have the potential to stall the damaging effects of alcohol on the fetal brain, a new study suggests.

Ibuprofen reduced neuroinflammation and behavioral signs of alcohol exposure in a rat model of fetal alcohol spectrum disorders (FASD).

The study was the first to directly link alcohol-induced inflammation in the hippocampus to cognitive impairment later in the life, said Derick Lindquist, senior author and a professor of psychology at The Ohio State University.

The findings, which appear in the journal *Behavioural Brain Research*, could have eventual implications reaching beyond fetal alcohol spectrum disorders, because neuroinflammation is a hallmark of many neurological diseases, he said.

In humans, fetal exposure to alcohol can lead to a cluster of life-altering problems including trouble learning, remembering and paying attention. Though estimates are imprecise, experts estimate that as many as two to five of every 100 U.S. schoolchildren have lasting problems resulting from early alcohol exposure, according to the Centers for Disease Control and Prevention.

Recent related research showed that neuroinflammation soon after birth can impair learning and memory later in life and that anti-inflammatory treatment has the power to prevent those impairments.

In this study, Lindquist and his co-authors set out to examine the role of neuroinflammation in the development of fetal alcohol spectrum disorders and cognitive dysfunction.

Some of the animals in the study were exposed to alcohol four to nine days after birth - the scientific equivalent of the third trimester in a human pregnancy. Alcohol-exposed rats given ibuprofen had lower levels of inflammation in the brain than those given saline solution. Twenty-five days later they also exhibited enhanced long-term memory.

The research helps define the role of the brain's immune system—and of inflammation in particular—in the development of cognitive dysfunction after fetal alcohol exposure, Lindquist said.

While it's too soon to speculate on implications in humans, it could pave the way for future research into potential treatments for fetal alcohol spectrum disorders and other neurological problems, said lead author Molly Goodfellow, who worked on the study as an Ohio State graduate student and is now at the University of Maryland.

"We hope that our work will promote future studies to determine how long neuroinflammation persists after alcohol exposure and if anti-inflammatory therapies might work if administered after birth or later in life to improve cognitive function in people with FASD."

Lindquist and Goodfellow said it's important to note that ibuprofen is generally not recommended for pregnant women because of risks to the mother and the fetus.

"At this point in our study, the ibuprofen is kind of like using a sledgehammer to reduce neuroinflammation. It's possible other anti-inflammatory drugs could have similar pro-cognitive effects with less risk," Lindquist said.

More information: Molly J. Goodfellow et al. Mitigation of postnatal ethanol-induced neuroinflammation ameliorates trace fear memory deficits in juvenile rats, *Behavioural Brain Research* (2017). DOI: 10.1016/j.bbr.2017.09.047